SolarEdge Control & Communication Gateway Installation Guide

Disclaimers

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment OFF and ON, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

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About This Guide

This user guide is intended for Photovoltaic (PV) system owners, installers, technicians, maintainers and integrators who use the SolarEdge power harvesting system.

This guide describes the process of installing and configuring the SolarEdge Control and Communication Gateway (referred to as Gateway).

This guide assumes that the SolarEdge power harvesting system is already installed and commissioned. For additional information about how to install and commission the SolarEdge power harvesting system, refer to the relevant inverter or safety and monitoring system (SMI) installation guide.

The guide includes the following chapters:

- **Chapter 1: Introducing the SolarEdge Control and Communication Gateway**, page 7, introduces the SolarEdge control and communication gateway.
- **Chapter 2: Installing the SolarEdge Gateway**, page 9, describes how to install the SolarEdge gateway.
- **Chapter 3: SolarEdge Gateway User Interface,** page 12, describes how to configure the SolarEdge Gateway and how to identify its status.
- **Chapter 4: Setting Up Communication through the Gateway,** page 23, describes how to set up communication through the SolarEdge Gateway to the SolarEdge monitoring portal.
- **Chapter 5: Environmental Sensors,** page 34, describes how to connect and configure external environmental sensors to the SolarEdge Gateway.
- **Appendix A: Technical Specifications,** page 41, provides the electrical and mechanical specifications of the SolarEdge Gateway device.

For further information, datasheets and the most up-to-date certifications for various products in different countries, please visit the SolarEdge website: *www.solaredge.com*

Support and Contact Information

If you have technical queries concerning our products, please contact us:

US & Canada	1877 360 5292	support@solaredge.us
Germany	+49 89-45459730	support@solaredge.de
France	0800917410	support@solaredge.fr
Belgium	080073041	support@solaredge.be
Italy	800 784 824	support@solaredge.it
Netherlands	08000221089	support@solaredge.com
United Kingdom	08002061058	
Greece	00800125574	
Israel	+972 73 240-3118	
Australia	1800149229	
Worldwide	+972 73 240-3118	
Fax	+972 73 240-3117	

Before contacting, ensure you have the following information at hand:

- The communication method to the SolarEdge server
- The product serial number as appears on its label. The serial number can also be viewed in the Status screen, as described on page 19.
- The software version, which can be viewed in the Status screen, as described on page 19

Handling and Safety Instructions

During installation, testing and inspection, adherence to the following handling and safety instructions is mandatory.

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

WARNING!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.

CAUTION:

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the instrument**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

NOTE:

Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE:

Denotes information about safety issues.

Chapter 1: Introducing the SolarEdge Control and Communication Gateway

Overview

The SolarEdge control and communication gateway expands the SolarEdge monitoring and control capabilities. It can be connected to SolarEdge and non-SolarEdge inverters, environmental sensors and revenue meters and can transfer the monitoring data to the SolarEdge monitoring server and optionally, to a non-SolarEdge logger.

The control and communication gateway has an interface that allows for controlling of the SolarEdge inverters' power.

The control and communication gateway can connect to the following devices[1]:

- SolarEdge devices, such as inverters and safety and monitoring interfaces (SMIs)
- Non-SolarEdge inverters for inverter data monitoring on the SolarEdge portal
- Environmental sensors
- Revenue grade meters
- 3rd party external loggers for inverter data monitoring
- Power reduction control devices

NOTE:

Sensors, meters, loggers, and power reduction control devices are purchased separately (not supplied by SolarEdge).

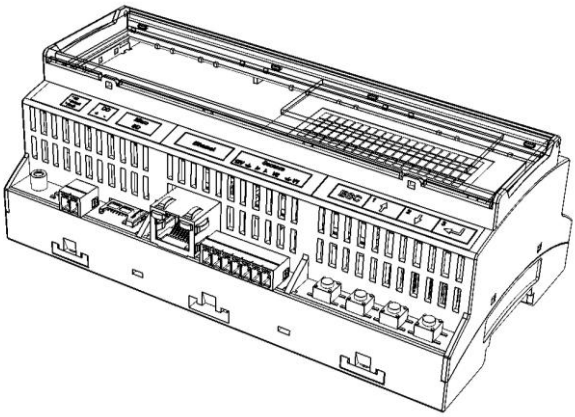


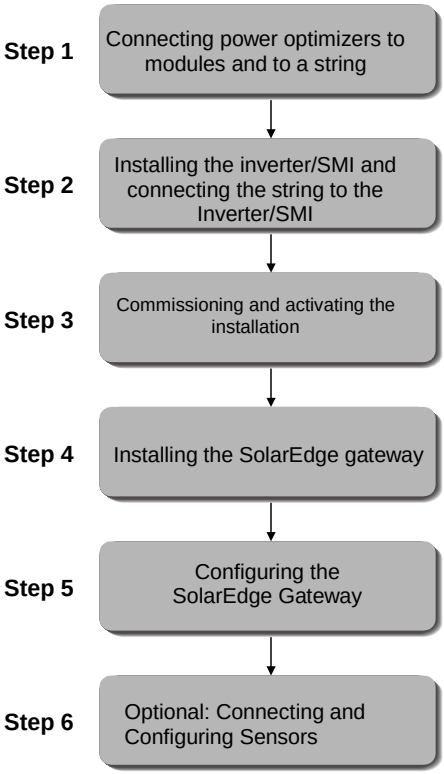
Figure 1: The SolarEdge Control and Communication Gateway

[1] For a list of supported environmental sensors, revenue meters, and third party inverters, refer to http://www.solaredge.com/articles/se-supported-devices

SolarEdge System Installation Workflow

The following provides an overview of the workflow for installing and setting up a new SolarEdge site.

Only Steps 5, 6 and 7 are described in this guide.


Step 1
Connecting power optimizers to modules and to a string
Refer to the applicable Power Optimizer installation guide.
Step 2
Installing the inverter/SMI and connecting the string to the Inverter/SMI
Refer to the applicable inverter/SMI installation guide.
Step 3
Commissioning and activating the installation
Refer to the applicable inverter/SMI installation guide.
Step 4
Installing the SolarEdge gateway
Page 12
Step 5
Configuring the SolarEdge Gateway
Page 14
Step 6
Optional: Connecting and Configuring Sensors
Page 37

Chapter 2: Installing the SolarEdge Gateway

Safety

CAUTION:

For North America only: The product's communication with external devices, must not use wires that span more than one building, as per the UL 60950-2 standard.

Transport and Storage

Transport the SolarEdge Gateway in its original packaging, without exposing it to unnecessary shocks. If the original package is no longer available, use a similar box, which can be closed fully.

Store the SolarEdge Gateway in a dry place where ambient temperatures are -40°C (-40°F) to +60°C (140°F).

Package Contents

- Control and communication Gateway
- 100-240VAC to 12VDC wall-mount power supply with an interchangeable AC plug (US,EU,AU)
- Accessory kit including:
  - Three 3-pin terminal blocks
  - One 7-pin terminal block
  - One 6-pin terminal block

Installation Guidelines

The following requirements apply when locating and mounting the SolarEdge Gateway:

- The SolarEdge gateway is suitable for mounting indoors only. For outdoor installation, use an external outdoor enclosure (not provided by SolarEdge)
- The SolarEdge gateway must always remain in an ambient temperature of -20°C (-4°F) to +60°C (140°F).
- Cable specifications:

Connection Type	Cable Type	Maximum Length
Entire RS485 communication bus (per RS485 port)	4-wire twisted pair cable (two twisted pairs). Recommended wire size: 20 AWG / 0.52 mm^2	1,000m (3,330 ft)
Ethernet	CAT5/6	100m (325 ft).
Sensor/control interface	Recommended wire size: 20 AWG / 0.52 mm^2	50m (165 ft)

- The SolarEdge gateway power supply requires a socket outlet with a grid voltage of 100 V - 240 V (50 Hz/60 Hz).
- Protect the SolarEdge gateway from dust, wet conditions, corrosive substances and vapors.

Mounting and Connecting the SolarEdge Gateway

The SolarEdge gateway can be installed on a wall or on a DIN rail.

To mount the SolarEdge gateway on a wall:

1. Determine the mounting location. Leave a minimum of 10 cm (4") clearance from the top and bottom of the SolarEdge gateway for cable connection and routing.
2. Open the clips at the rear of the gateway by pushing the clips outwards.

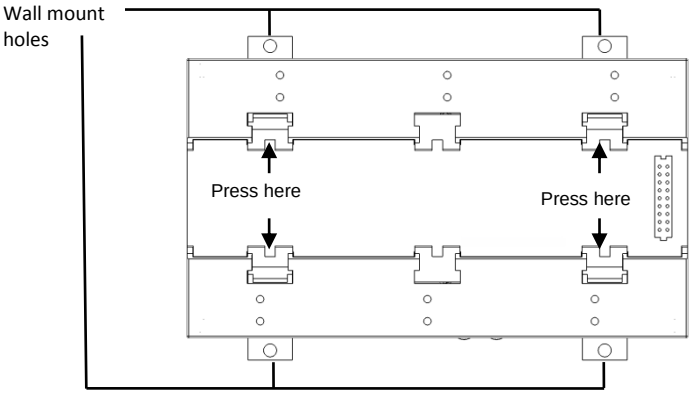


Figure 2: Clips in Open Position

3. Position the device on the wall with the open clips, as shown in Figure 2. Mark points through the holes of the clips and drill holes using a 6mm diameter drill bit.
4. Mount the unit using screw anchors and screws (use 3.5mm diameter screws, 20mm minimum length, not provided by SolarEdge).

To mount the SolarEdge gateway on a DIN rail:

1. Ensure that the clips are closed, as shown below:

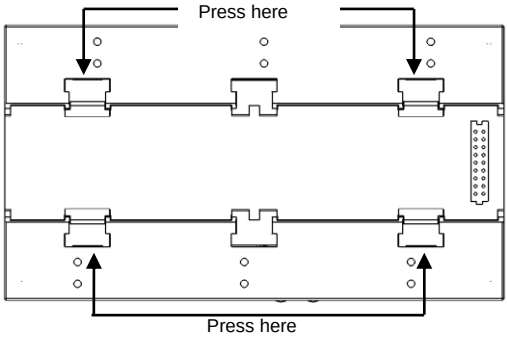


Figure 3: Clips in Closed Position

2. Hook the two lower clips of the SolarEdge gateway onto the lower edge of the DIN rail.
3. Press the SolarEdge gateway upwards and snap it into the upper edge of the DIN rail. When on the rail, the clip "grips" the rail on both the top and bottom lips of the rail.
   To remove the DIN clip from the rail, simply push upwards on the DIN clip (thereby compressing the springs in the bottom), pivot the top of the clip off of the rail, and then move the whole clip down to also release the bottom of the clip. No screwdrivers or special tools are required.
4. The following figure shows the gateway's rear side when mounted on a DIN rail.

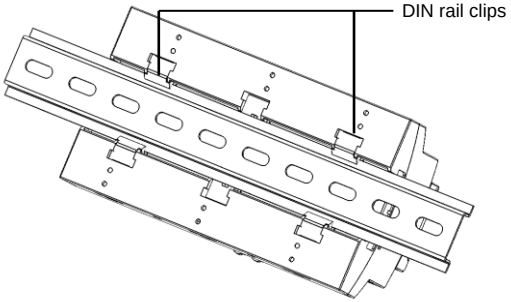


Figure 4: Gateway Mounted on a DIN Rail

To connect the SolarEdge gateway to the AC:

For connecting to power, use the supplied wall-mount power supply:

1. Insert the power supply DC connector to the SolarEdge gateway (see Figure 5).
2. Connect the power supply to the AC mains. The LEDs are lit to indicate power connection.

NOTE:
If you use a non-SolarEdge power supply, check that it has 12Vdc/1A output ratings, and that it is certified to UL/CSA/IEC60950-1 2ed standards. Limited Power Source output, NEC class 2

Chapter 3: SolarEdge Gateway User Interfaces

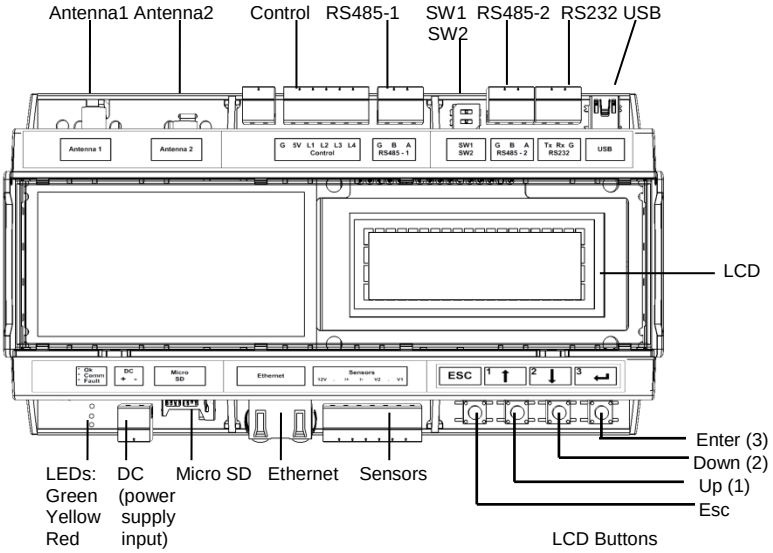


Figure 5: Gateway Interfaces

Overview

LEDs

The front of the SolarEdge Gateway has an LCD panel and three LEDs, as shown above:

The gateway has three LED indicators, as follows:

- **Power OK (Green):** Indicates whether or not the SolarEdge gateway is connected to power
- **Communication (Yellow):** This LED blinks when monitoring information is received from a device.
- **Fault (Red):** Indicates that there is an error. For more information, contact SolarEdge support.

All LEDs are ON while the SolarEdge gateway is being configured.

LCD and LCD-Menu Buttons

The LCD screen displays various configurable menus and status parameters of the SolarEdge gateway. Four buttons are used for controlling the LCD menus (see Figure 5).

- **Esc:** Moves the cursor to the beginning of the currently displayed parameter, goes to the previous menu and cancels a value change.
- **Up (1), Down (2):** Moves the cursor from one menu option to another, moves among the characters of a displayed parameter and toggles between possible characters when setting a value.
- **Enter (3):** Selects a menu option or accepts a value change. Also used to enable LCD backlight

The LCD panel and buttons are used during the following processes:

- **Setup:** After the gateway installation, the installer may perform basic gateway configuration, as described in *Setup Menu Options* on page 14.
- **Operational Mode:** The LCD panel allows checking that the gateway is working properly. Refer to *Status Screens* on page 19 for a description of this option. Use the LCD button to toggle through the informative displays.

Communication Connectors

- **Antenna1**: used for optional wireless ZigBee antenna connection (refer to *Creating a Wireless ZigBee Connection* on page 31.
- **Antenna2:** Currently not installed
- **RS485-1 and RS485-2**: used for connecting external devices to the gateway (refer to *Creating an RS485 Bus Connection* on page 26)
- **RS232**: enables connection of the SolarEdge gateway to an external SolarEdge GSM modem that has an RS232 connection (refer to *Creating an RS232 (UART) Connection* on page 26)
- **USB**: Enables PC/laptop connection for using the SolarEdge configuration tool.
- **Ethernet**: enables connecting the SolarEdge gateway to the SolarEdge monitoring portal through an Ethernet switch/router (refer to *Creating an Ethernet (LAN) Connection* on page 24). The Ethernet switch/router should be connected to the Internet.

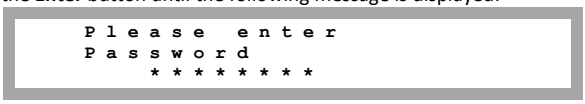
Other Interfaces

- **Control**: used for connection to an external power reducer device
- **SW1/SW2**: RS485-1/2 termination
- **DC**: used for the power supply input as described in *To connect the SolarEdge gateway to the AC* on page 11.
- **Micro SD**: used for field software upgrade
- **Sensors**: enables connecting to external environmental sensors (refer to *Chapter 5: Environmental Sensors* on page 34).

Setup Menu Options

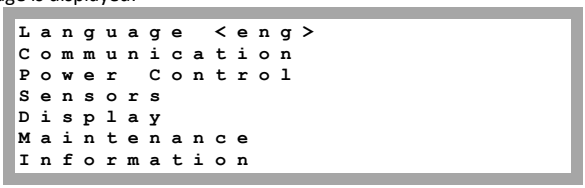
After installation, the installer may perform basic gateway configuration.

1. Verify that the SolarEdge gateway is connected to a power outlet.
2. Press the **Enter** button until the following message is displayed:

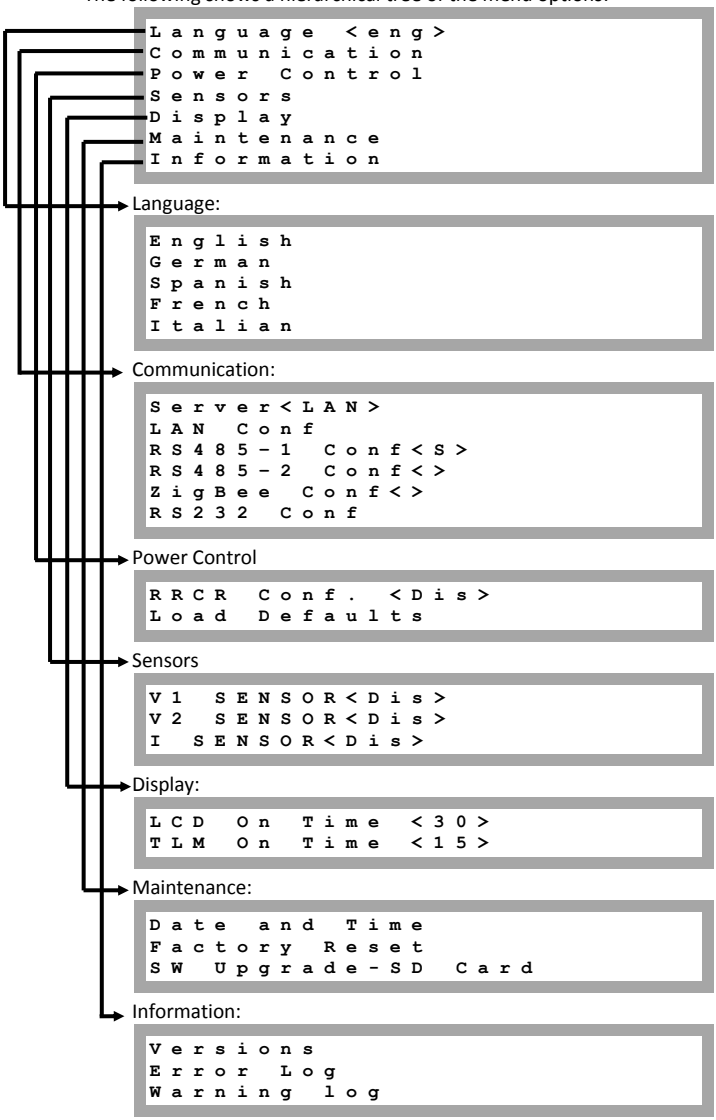


The gateway is now in Setup mode and all its LEDs are lit. The gateway automatically exits Setup mode if no buttons are pressed for more than 2 minutes.

3. Use the three-right-most LCD buttons to type in the following password: **12312312**. The following message is displayed:



The following shows a hierarchical tree of the menu options:



This section describes how to use the LCD menus for configuring the SolarEdge gateway.

Language

Select the **Language** option to set the language in which the LCD should display. The default setting is English.

Communication

1. Select the **Communication** option to define and configure the communication option used by the gateway to communicate with the SolarEdge Monitoring Server and the communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as: revenue meters or loggers.
2. Set the communication options as described in *Chapter 4: Setting Up Communication through the Gateway* on page 23.

The following shows a hierarchical tree of the menu options in the **Communication** menu. For detailed information of commonly used the configuration options, refer to the Communication Options application note, available on the SolarEdge website http://www.solaredge.com/files/pdfs/solaredge-communication_options_application_note_v2_250_and_above.pdf.

Communication:

```
Server<LAN>
LAN  Conf
RS485-1  Conf<S>
RS485-2  Conf<>
ZigBee  Conf<>
RS232  Conf
```

Server:

```
LAN
RS232
RS485
Zigbee
None
```

LAN Conf:

```
IP  Config
Set  DHCP  <en>
Set  IP
Set  Mask
Set  Gateway
Set  DNS
Set  Server  Addr
Set  Server  Port
```

RS485-1/2 Conf:

```
Device  Type<SE  >
Protocol<S>
Device  ID<1>
```

ZigBee Conf (enabled only if the ZigBee .module is connected):

```
Device  Type<SE>
Protocol<MPM>
Device  ID<1>
PAN  ID
Scan  Channel
Load  ZB  Defaults
Slave  Detect  <0>
```

RS232 Conf:

```
Device  Type<SE  >
Protocol<DRCT>
```

Power Control

For detailed information about power reduction control connection and configuration, refer to the Power Reduction Control application note, available on the SolarEdge website

http://www.solaredge.com/files/pdfs/power-reduction-control-application-note.pdf

```
RRCR  Conf.
Load  Defaults
```

Sensors

Select **Sensors** to set the following options:

```
V1  Sensor<Dis>
V2  Sensor<Dis>
I  Sensor<Dis>
```

The SolarEdge gateway sensor interface supports up to three analog sensors:

- **V1, V2**: Voltage sensors
- **I**: Current sensors

For detailed information about all the configuration options for sensors, refer to *Chapter 5: Environmental Sensors* on page 34.

Display

Select **Display** to set the following:

```
LCD  On  Time<30>
```

- **LCD On Time <30>**: The number of seconds that the LCD backlight is ON after the LCD button is pressed. Set to 0 if you want the LCD to be lit at all times.

Maintenance

Select **Maintenance** to set the following options:

```
Date  and  Time
Factory  Reset
SW  Upgrade  SD  Card
```

- **Date and Time**: Set the internal real-time clock. If connected to the SolarEdge monitoring portal, the date and time are set automatically and only time zone should be set.
- **Factory Reset**: Perform a general reset to the gateway default settings.
- **SW Upgrade SD Card**: Perform a software upgrade using an SD card.

Information

Select **Information** to display the following options:

```
Versions
Error Log
Warning log
```

- **Versions:** Displays inverter firmware versions :

```
ID:  ########  ##
CPU  :0002.0336.0000
```

  - **ID:** The SolarEdge gateway ID. 10 last digits of the S/N
  - **CPU:** The communication board firmware version.

NOTE:
Please have these numbers ready when you contact SolarEdge support.

- **Error Log:** Displays the last five errors.
- **Warning Log:** Displays the last five warnings.

Status Screens

During normal operation, pressing the Enter button turns the LCD backlight ON. Additional presses on the Enter button display the following screens one after the other. The backlight is active for 120 seconds by default. This duration is configurable, as described on page 18.

Initial Gateway Status

```
RRCR:Disabled
Sensors:Disabled
Server:LAN          <S_OK>
Total # of Slaves:--
```

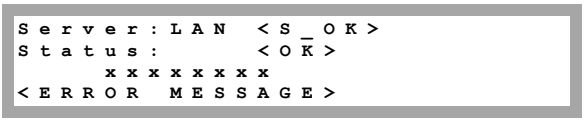
- **RRCR:** If enabled, indicates the active power set by the power control interface, in percent.
- **Sensors**: Enable/disable status of Sensors' input reading
- **Server:** Server communication method
- **Total # of Slaves**: Indicates the total number of slave devices communicating with the SolarEdge gateway

ID Status

This window displays the ID of the gateway and the software version.

```
ID:  ########  ##
CPU:0002.0336
```

Server Communication Status

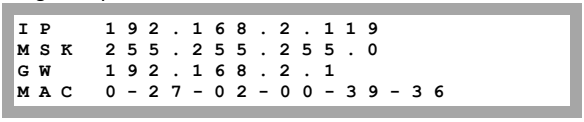


- **Server**: The method of connection to the SolarEdge monitoring server.
  - LAN
  - RS232
  - RS485 (only applicable for slave SolarEdge devices on the RS485 bus)
  - ZigBee (only applicable for slave ZigBee devices)
  - None
- **S_OK**: The connection to the SolarEdge monitoring server is successful (appears only if the inverter is connected to the portal).
- **Status**: Displays OK if the gateway established a successful connection and communication with the specified server port/device (LAN, RS485, ZigBee transceiver or RS232 – used for external GSM modem)

  If the **OK** status is not displayed, then an error has occurred.
- **xxx**...:Eight-bit Ethernet Communication Connection Status: When Ethernet communication is used, an additional row with a string of 1s and optionally 0s is displayed. 1 indicates OK, 0 indicates an error. For a list of possible errors and how to troubleshoot them, refer to *Troubleshooting Communication* on page 32. The following is a list of bits description, ordered left-to-right:
  - **Bit 1**: The Ethernet link, physical Ethernet cable connection, WLAN link and GSM connection are all OK.
  - **Bit 2**: The DHCP IP is OK. The IP was successfully obtained from DHCP (if set to static IP =1).
  - **Bit 3**: The ping gateway is OK. The ping to the first hop switch/router passed or the ping to APN was OK.
  - **Bit 4**: The ping to google.com was OK.
  - **Bit 5**: The ping to server1 was OK.
  - **Bit 6**: The ping to server2 was OK.
  - **Bit 7**: The ping to server3 was OK.
  - **Bit 8**: Communication to the SolarEdge server is OK.
- **Error message**: Refer to *Troubleshooting Communication* on page 32.

IP Status

This window describes the Ethernet configuration: IP, Mask, gateway and MAC address (Media Access Control) of the gateway.

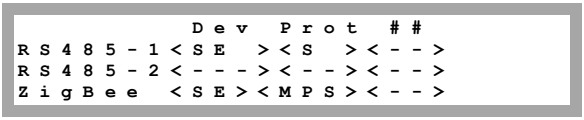


ZigBee Status

This window describes the ZigBee configuration:

- **PAN**: The ZigBee transceiver pan ID.
- **CH**: The ZigBee transceiver channel
- **RSSI**: The receive signal strength of the neighboring ZigBee transceiver. L = low, M = medium, H = high and - = no signal.
- **ID**: The ZigBee transceiver ID.
- **ZigBee Ready**: This field is shown only in devices with ZigBee router transceivers (slaves), in a multi-point (MP) protocol configuration. If a ZigBee transceiver is not physically connected, a **No ZigBee** message is displayed.

Communication Ports Status



This window presents the communication port (RS485-1/2 or ZigBee), and the devices connected to them, with details about the number, type, and protocol.

- **DEV**: The type of device that was configured to the specific port (based on the port's functionality), as follows:
  - **SE**: SolarEdge device (default)
  - **MTR**: Revenue meter reader
  - **LGR**: Non-SolarEdge logger
  - **INV**: Non-SolarEdge inverter reader
- **PROT:** The protocol type to which the port is set:

  For a SolarEdge device:
  - **S:** SolarEdge slave
  - **M**: SolarEdge master
  - **P2P:** ZigBee point-to-point
  - **MPM:** ZigBee multipoint master (for a ZigBee coordinator module)
  - **MPS:** ZigBee multipoint slave (for a ZigBee router module)

  For a non-SolarEdge logger:
  - **SS:** SunSpec

  For non-SolarEdge inverter readers and revenue meter reader, refer to http://www.solaredge.com/articles/se-supported-devices.
- **##**: The total number of slaves detected on the specific port

Sensors Status

This window displays the status of up to three different sensors connected to the gateway.

- **V1**: Displays the real time reading of the sensor connected to V1 sensor input
- **V2**: Displays the real time reading of the sensor connected to V2 sensor input
- **I:** Displays the real time reading of the sensor connected to I sensor input

The reading is displayed according to the relevant sensor that was configured on the specific sensor input:

- Temperature sensor - the degrees reading in Celsius or Fahrenheit
- Irradiance reading - in W/m2
- Wind speed, in m/s.
- Wind direction, in Deg.

Chapter 4: Setting Up Communication through the Gateway

Communication Dataflow

The SolarEdge site information can be accessed remotely using the SolarEdge monitoring portal, as described in the *SolarEdge Monitoring Portal User Guide*. In order to transfer monitoring data from a SolarEdge site to the SolarEdge monitoring portal, a communication connection must be set up. Communication setup is not required for power harvesting and is needed only when using the monitoring portal.

This chapter describes how to set up this connection.

Communication Types

The following types of communication can be used to transfer the monitored information from the inverter to the SolarEdge monitoring portal through the SolarEdge gateway:

- **RS232 (UART):** Used to connect to an external GSM modem that has an RS232 port
- **Ethernet:** Used for a LAN connection
- **RS485:** Enables connection of external devices, such as other SolarEdge devices, loggers or a revenue gauge meter, and transferring them through the SolarEdge gateway to the SolarEdge monitoring portal using either a GSM modem (connected to RS232) or Ethernet. The SolarEdge gateway has two RS485 physical ports:
  - **RS485-1:** Enables connection of multiple SolarEdge devices (inverters/SMIs/gateways) through the same bus to the SolarEdge gateway, such that connecting only one gateway to the server is sufficient to provide communication services for all the devices on the bus.
  - **RS485-2:** Enables connection of third-party devices, such as revenue metering devices, and non-SolarEdge inverters.
- **Mini-USB:** Enables PC/laptop connection for software upgrade using the SolarEdge configuration tool. Use a USB to mini-USB cable for this connection.
- **ZigBee (optional):** Enables wireless connection of one or more SolarEdge devices through a ZigBee transceiver.

Creating an Ethernet (LAN) Connection

Overview

This communication option enables using an Ethernet connection to connect the SolarEdge gateway to the SolarEdge monitoring portal through a LAN. The SolarEdge gateway has an RJ45 connector for Ethernet communication.

You can connect more than one SolarEdge gateway to the same switch/router or to different switches/routers, as required. Each gateway sends its monitored data independently to the SolarEdge monitoring portal. All connections are initiated from the SolarEdge gateway so that no port forwarding is required.

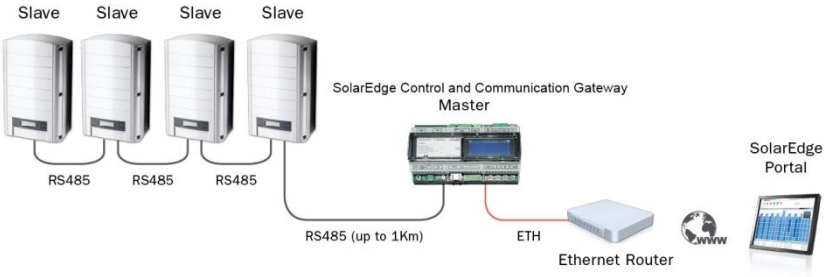


Figure 6: Example of Ethernet Connection

Ethernet Communication Configuration Options

The following is a description of the options to configure the Ethernet (LAN) port settings.

Communication:

```
Server<LAN>
LAN  Conf
RS485-1  Conf<S>
RS485-2  Conf<>
ZigBee  Conf<>
RS232  Conf
```

LAN Conf

```
IP  Config
Set  DHCP  <en>
Set  IP
Set  Mask
Set  Gateway
Set  DNS
Set  Server  Addr
Set  Server  Port
```

- **IP Config:** Displays the current IP configuration of the gateway, as shown below. If DHCP is used, this screen reflects the parameters retrieved from the DHCP server. If manual settings are used, the screen shows the last manually input configurations.

```
IP    0.0.0.0
MSK   255.255.255.0
GW    192.168.0.1
DNS   0.0.0.0
```

- **Set DHCP <En>:** If the LAN connection between the gateway and the SolarEdge Monitoring Portal has a DHCP server, enable this option by setting it to **Enable** (default). If this option is enabled, then the DHCP server automatically configures the IP, Subnet Mask, gateway and DNS. If not, set them manually.
- **Set IP:** Enables setting the IP of the gateway according to the LAN settings:
  - Use the **Up** and **Down** buttons to adjust the value of each IP address octet.
  - Press the **Enter** button to move to the next IP address octet.
  - Long press the **Enter** button (until **Applied** message appears) – apply the value
  - Long press the **Esc** button (until **Aborted** message appears) – erase all characters

```
S e t u p   I P
1 9 2 . 1 6 8 . 2 . 7
```

- **Set Mask:** Set the subnet mask of the SolarEdge gateway according to the LAN settings.
- **Set Gateway:** Set the gateway address of the SolarEdge gateway according to the LAN settings.
- **Set DNS:** Set the DNS of the SolarEdge gateway according to the LAN settings.
- **Set Server Addr:** Set the IP address of the SolarEdge monitoring portal. This option is predefined in the SolarEdge gateway to specify the SolarEdge monitoring portal IP address and does not normally need configuration.
- **Set Server Port:** Set the port through which to connect to the SolarEdge monitoring portal. This option is predefined in the gateway to specify the SolarEdge monitoring portal IP port and normally does not need configuration.

NOTE:

If your LAN has a firewall, you must verify that the address and port configured in the **Set Server Addr** and the **Set Server Port** fields are not blocked.
You may need to configure it to enable the connection to the following address:
Destination Address: prod.solaredge.com
Port: 22222

Connecting and Configuring LAN

► To connect the Ethernet port to the router/switch:

1 Use a pre-crimped cable or use a crimper to prepare an RJ45 communication connector on both ends of a standard CAT5/6 cable: Insert the eight wires into the RJ45 connector.

Pin	Wire Color
1	White/green
2	Green
3	White/Orange
4	Blue
5	White/Blue
6	Orange
7	White/Brown
8	Brown

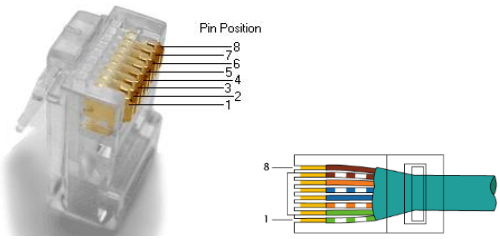


Figure 7: Inserting Wires into the RJ45 Connector

2 Connect one end of the Ethernet cable to the RJ45 plug at the router or Ethernet gateway that is connected to the Internet.

3 Connect the other end to the SolarEdge gateway Ethernet connector.

▶ To configure Ethernet communication to the SolarEdge monitoring portal:

The server communication method is configured by default to **LAN with DHCP enabled**.
If a **different** setting is required, follow the steps below:

1 Enter Setup mode, as described in *Setup Menu Options* on page 14 .

2 To configure the LAN to Static IP select the following in the LCD menus on the gateway:
- **Communication ➔ Server ➔ LAN**
- **LAN Conf ➔ Set DHCP ➔ *<Dis>***

3 Set the IP, mask, gateway DNS, server address, and server port as necessary using the LCD User buttons. Refer to the *Ethernet Communication Configuration Options* on page 24.

4 Verify the connection, as described in *Verifying the Connection* on page 31.

5 Exit the Setup mode.

Creating an RS232 (UART) Connection

This communication option enables connecting the SolarEdge gateway to an external SolarEdge GSM modem that has an RS232 connection. This device is provided with a user manual, which should be reviewed prior to connection. Refer to http://www.solaredge.com/files/pdfs/se_application_gsm.pdf.

Creating an RS485 Bus Connection

Overview

The RS485 option enables creating a bus of up to 31 slave SolarEdge devices, connected to one master SolarEdge gateway, which is the connection point between the RS485 bus and the SolarEdge monitoring portal. Using this option, inverters are connected to each other in a chain, via their RS485 connectors.

The RS485 bus uses a four-wire twisted-pairs cable connected to the RS485-1/2 terminal blocks on the SolarEdge gateway.

The following sections describe how to connect the RS485 bus and how to configure its components.

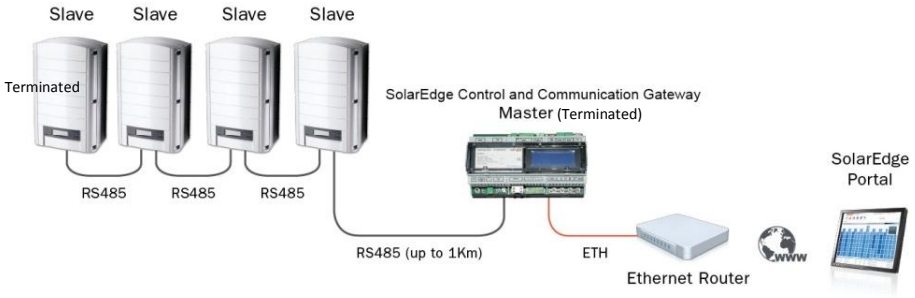
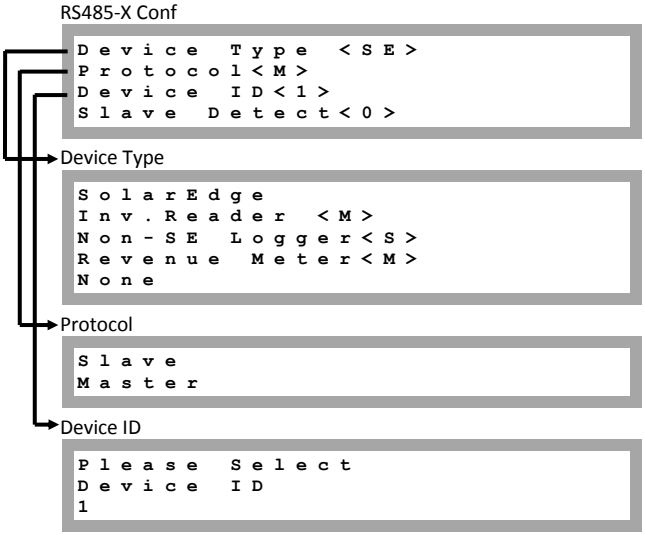


Figure 5: Example of RS485 Connection

RS485 Configuration Options

In all configurations, use the following RS485 port configuration menus.



- **Device Type** is used to select the specific port configuration. The following devices are supported:
  - **SolarEdge** (default for RS485-1): Used when connecting to SolarEdge devices, such as: inverters, SMIs or other gateways. By default, all SolarEdge devices are pre-configured as slaves on the RS485-1 port.
  - **Inv. Reader**: Used for connecting to a non-SolarEdge inverter, in order to read its data and send it to the monitoring portal. For a list of supported Non-SolarEdge inverters, refer to http://www.solaredge.com/articles/se-supported-devices.
  - **Revenue Meter**: Used when connecting to an external revenue grade meter, in order to read the meter data and send it to the monitoring portal. For a list of supported meters, refer to http://www.solaredge.com/articles/se-supported-devices.
  - **Non-SE Logger**: Used when connecting to an external non-SolarEdge logger. The logger can read SolarEdge inverters data for Non-SolarEdge monitoring purposes.
  - **None** (default for RS485-2)
- **Protocol**:
  - When selecting a SolarEdge device, the following protocols appear under the Protocol option:
    - Slave (default)
    - Master
  - When selecting Device Type <Inv. Reader>, the Device Type <field> changes to Device Type **<INV>**
  - When selecting Device type <Non-SE Logger>, the Device Type <field> changes to Device Type **<LGR>** and the following protocol appears under the Protocol option: **SunSpec** (default)
  - When selecting Device type <Revenue Meter>, the Device Type <field> changes to Device Type **<MTR>**

NOTE:
For other supported protocols, refer to http://www.solaredge.com/articles/se-supported-devices.

- **Device ID**:
  The device ID is used to set the SolarEdge gateway device ID (MODBUS ID) when connecting to an external master device (for example, a non-SolarEdge logger), or to set the ID of the external device (for example, revenue meter).
- **Slave Detect:** Is used to initiate automatic detection of the slave devices connected to this master gateway. The number next to the option is the number of devices that have been detected.

Connecting and Configuring RS485 Bus

The first and last devices in the chain must be terminated. Do not terminate units along the bus.

Use a four-wire twisted-pairs cable connected to the RS485-1/2 terminal blocks on the SolarEdge gateway.

▶ To connect the RS485 communication bus between inverters/SMIs and SolarEdge gateway:

1. Use one of the supplied 3-pin terminal blocks and insert the ends of wires into the **A**, **B** and **G** pins.

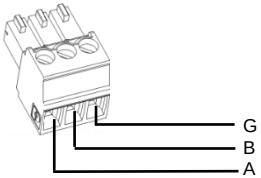


Figure 8: 3-pin Terminal Block

2. Designate a single RS485 port on the SolarEdge gateway as the connection point between the RS485 bus and the SolarEdge monitoring portal (see Figure 9). This port will serve as the master for this installation. Connect the 3-pin terminal block to the designated port on the gateway.

NOTE:
RS485-1 is configured as SolarEdge device by default, therefore RS485-1 is recommended as the RS485 bus connection point.

3. Terminate the gateway by switching a termination dipswitch to ON. The switches in the SolarEdge gateway are marked **SW1** for the RS485-1 port termination and **SW2** for the RS485-2 port termination, as shown below:

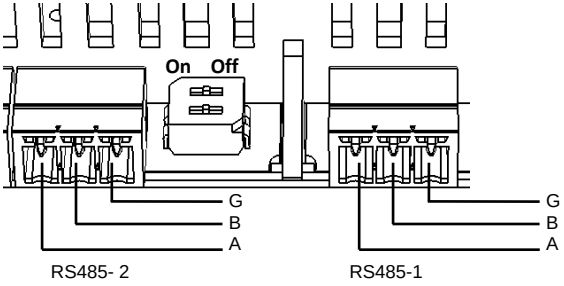


Figure 9: RS485 Connectors and Termination Switches

4 Connect the SolarEdge gateway to the SolarEdge monitoring server either through LAN or GSM.

5 Open the inverter/SMI cover as described in their manual.

6 Remove the seal from one of the openings in communication gland #2 and insert the wire through the opening.

7 Pull out the 9-pin RS485/RS232 terminal block connector, as shown below:

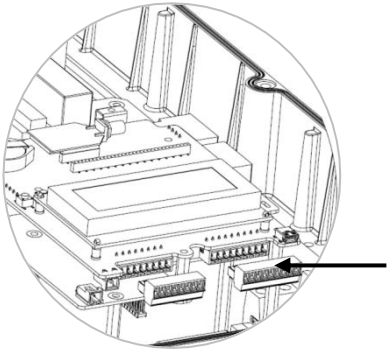


Figure 10: The RS485/RS232 Block Terminal In the Inverter/SMI

8 Loosen the screws of pins **B**, **A** and **G** on the left of the RS-485 block terminal:

- For inverter: RS485-1 pins (left-most)
- For SMI: RS485-1 (recommended, as this is the default configuration), or RS485-2

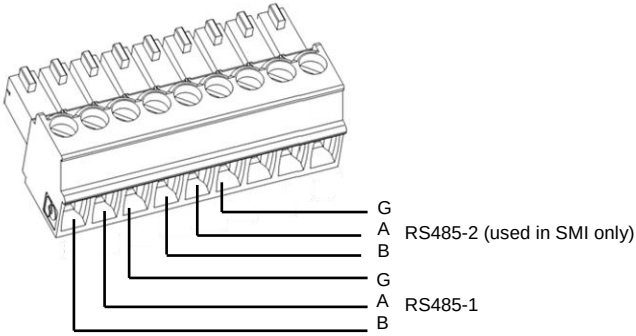


Figure 11: RS485/RS232 Block Terminal

9 Insert the ends of wires into the **G**, **A** and **B** pins shown above. Use Four- or six-wire twisted pair cable for this connection. You can use any color wire for each of the **A, B** and **G** connections, as long as the same color wire is used for all A pins, the same color for all B pins and the same color for all G pins.

10 Connect all **B**, **A** and **G** pins in all inverters/SMI. The following figure illustrates this connection schema (the illustration applies to both inverters and SMI):

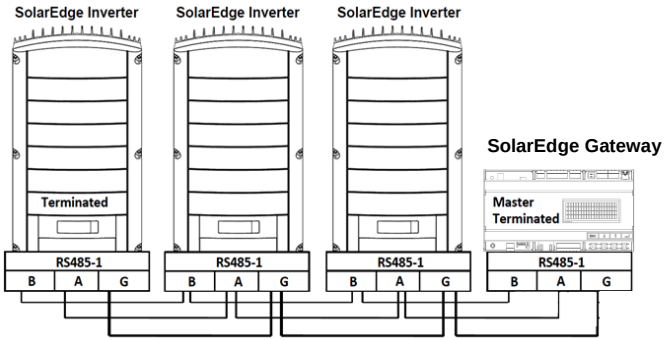


Figure 12: Connecting SolarEdge Devices (Inverters or SMI) in a Chain

NOTE:
Do not cross-connect **B**, **A** and **G** wires.
For inverters - Do not insert wires into RS485-2 pins.

11 Tighten the terminal block screws.

12 Push the RS485 terminal block firmly all the way into the communication board.

13 Terminate the first inverter/SMI in the chain by switching a termination dipswitch inside the inverter/SMI to ON (move the switch to the top). The switch is located on the communication board and is marked **SW7**.

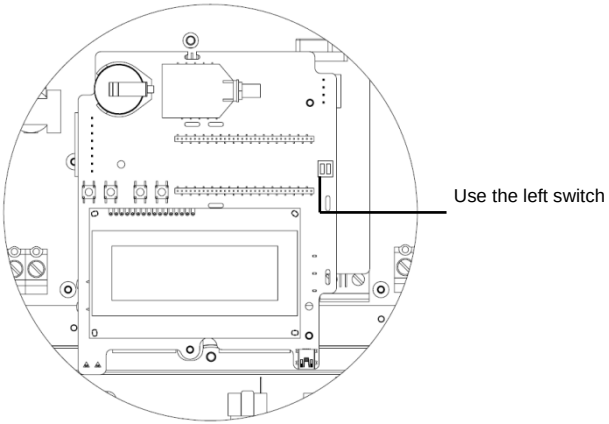


Figure 13: RS485 Termination Switch

NOTE:
Only the first and last SolarEdge devices in the chain should be terminated. The other devices in the chain should have the termination switch OFF.

To configure the RS485 communication bus with SolarEdge inverters:

By default, all SolarEdge devices are pre-configured as slaves on the RS485-1 port. Slaves can be further configured using the **RS485-1 Conf** option in the Communication menu.

1. Enter Setup mode, as described in *Setup Menu Options* on page 14.
2. Select **Communication ➔ Server ➔ RS485-X Conf** (X=1 or 2 depending on the specific physical port connection) to communicate with different external devices (SolarEdge inverters, revenue meters, non-SolarEdge loggers or non-SolarEdge inverters).
3. To configure the master (gateway), select the following in the LCD menus on the gateway:
   - **Communication ➔ RS485-1 Conf ➔ Device Type ➔ *SolarEdge***
   - **RS485-1 Conf ➔ Protocol ➔ *Master***
   - **RS485-1 Conf ➔ *Slave Detect***

   The system starts automatic detection of the SolarEdge slave inverters connected to the master gateway. The gateway should report the correct number of slaves. If not, verify the connections and terminations.
2. Verify the connection of the Master to the SolarEdge monitoring portal, as described in *Verifying the Connection* on page 32.

Creating a Wireless ZigBee Connection

This communication option enables using a ZigBee wireless connection for one of the following:

- To wirelessly connect the SolarEdge gateway to other SolarEdge devices (up to 31), and to the monitoring portal through the Ethernet or GSM
- To create a master/slave bus of connected SolarEdge devices

To configure ZigBee:

If a ZigBee transceiver is connected to the SolarEdge gateway, select **ZigBee Conf** to configure RS485 devices' functionality and settings.

Device Type

```
SolarEdge
```

- If a ZigBee coordinator (master) transceiver is installed, the following protocols are displayed:

  Protocol

  ```
  Multi-Point  Master
  P2P-Master
  ```

- If a ZigBee router (slave) transceiver is installed, the following protocols are displayed:

  Protocol

  ```
  Multi-Point  Slave
  P2P-Slave
  ```

- Device Types:
  - SolarEdge (default)
  - None
- Protocol

  For a Coordinator (master) transceiver, the following protocols are shown:
  - Multi-Point Master (default)
  - P2P – Master

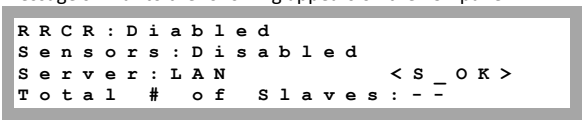
For a Router (slave) transceiver, the following protocols are shown:

- Multi-Point Slave (default)
- P2P – Slave

The ZigBee device is provided with a user manual, which should be reviewed prior to connection. It is available on the SolarEdge website at http://www.solaredge.com/files/pdfs/se_application_zigbee_communication.pdf.

Verifying the Connection

Wait for the SolarEdge gateway to connect to the SolarEdge monitoring portal. This may take up to two minutes. A message similar to the following appears on the LCD panel:



S_OK: The connection to the SolarEdge monitoring portal is successful. If S_OK is not displayed, refer to Troubleshooting Communication, below.

Troubleshooting Communication

To troubleshoot a communication problem:

1. If S_OK is not displayed, then perform the following:
   - Use a method independant of the SolarEdge gateway to check whether the network and modem are operating properly. For example, connect a laptop to the Ethernet router and connect to the Internet.
   - Check with your network administrator whether a firewall or another device is blocking transmission.
   - Check the configuration of the gateway
2. Check that the modem or gateway/router is functioning properly.
3. Check that the connection to the connector on the SolarEdge gateway communication board was performed properly.
4. Check that the selected communication option is properly configured:
   - If the SolarEdge gateway is Master – the server should be configured to Ethernet (LAN) or RS232.
   - If the gateway is Slave – the server should be configured to RS485 or ZigBee.
5. Check whether a firewall or another type of network filter is blocking communication.
6. Verify that the Status field in the Server Communication Status window displays OK. It indicates that the SolarEdge gateway has established a successful connection and communication with the specified server port/device (LAN, RS485, internal ZigBee module or external GSM modem).
   If the status is not OK, a text message is displayed:
   - For RS485 slave devices: **`No Master Found`**: The master device is not responsive or the RS485 cable is not connected.
   - For GSM modem and ZigBee transceiver errors, refer to their relevant manual.

To troubleshoot Ethernet communication:

When the gateway has Ethernet communication, the Server Communication Status window can be used to identify the location of the error.

xxxxxxxx is a string of 1s and 0s showing an eight-bit communication connection status. 1 indicates OK and 0 indicates an error. The possible errors and their troubleshooting are detailed in the following table:

Bit Location	Error Message	Error Description	Troubleshooting
1st	LAN Disconnected	An Ethernet physical cable connection fault: The Ethernet link or physical Ethernet cable are not connected properly	Check the cable pin-out assignment and cable connection
2nd	DHCP Failed, or Invalid DHCP Config	The inverter failed to get a valid IP address from the DHCP server, or The DHCP/static IP settings in the gateway are not the same as those of the router.	Check the router and gateway configuration
3rd	Gateway Ping Failed	The connection to the router is not available: Ping to the first hop switch/router failed (LAN error)	Check the physical connection to the switch/router. Check that the link LED at the router /switch is lit (indicating phy-link). If OK - contact your network IT, otherwise replace the cable or change it from cross to straight connection
4th	G Server Ping Failed	The connection to the Internet is not available: Ping to google.com failed	Connect a laptop and check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider. For WIFI networks, ensure that username and password are as defined in the internet provider AP/router.
5th	Server x Ping Failed	Ping to redundant server #x failed	Check the SolarEdge server address, as described on page 20.
6th			
7th			
8th	Tcp Connect. Failed	The connection to the SolarEdge server was not established: Communication with the server failed	

Chapter 5: Environmental Sensors

Overview

The SolarEdge gateway supports up to three analog sensors:

- Two sensors with voltage output (V1, V2), each supports different voltage ranges
- One sensor with current output (I)

The following environmental sensor types are supported:

Sensor Type	Range	Unit
Temperature	-99.0 to +99.0 -146.20 to 210.20	°C °F
Irradiance	0 to 9999	W/m2
Wind speed	0 to 99	m/s
Wind direction	0 to 359	degrees

You can view the sensors' data in the Status window (see *Sensors Status* on page 22), and in the SolarEdge monitoring portal.

This chapter describes how to connect and configure sensors to the SolarEdge gateway.

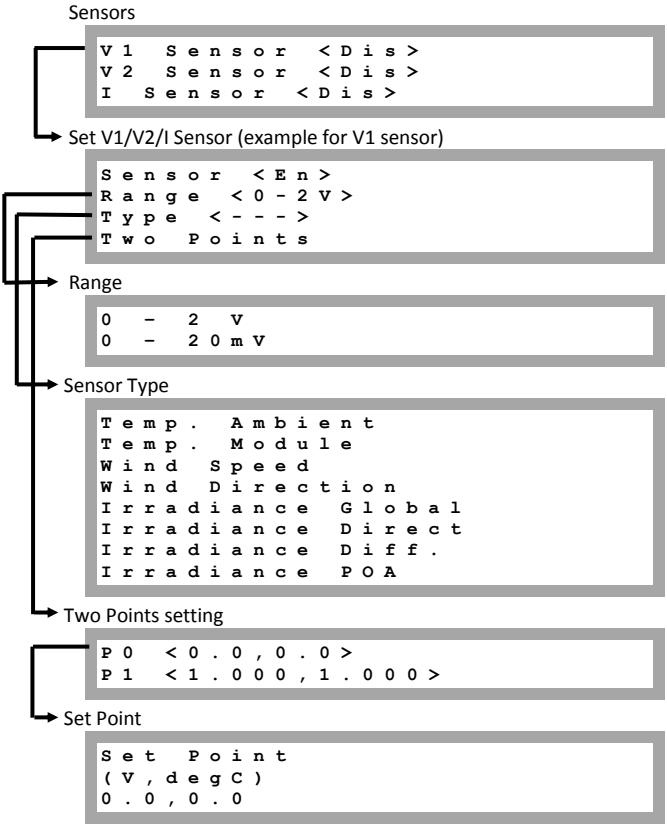
Figure 14: Example of Sensor Connection to the SolarEdge Gateway

For a list of recommended sensors and suppliers, refer to http://www.solaredge.com/articles/se-supported-devices.

Environmental Sensors Configuration Options

Menus

The SolarEdge gateway sensor interface is disabled by default. The following shows a hierarchical tree of the Sensors menu options:



- **Sensors**:
  - **V1 Sensor** and **V2 sensor**- sensors with voltage output, enabled or disabled
  - **I Sensor** – a sensor with current output, enabled or disabled
- **Range:**
  - V1 – select a range between 0 – 10 Vdc or 0 – 2 Vdc.
  - V2 – select a range between 0 – 2 Vdc or 0 – 20 mVdc.
  - I –0 – 20 mA

- **Type**: One of the following sensors:

Sensor Type	Description	Unit
Temp. Ambient	Ambient temperature sensor measurement	°C, °F
Temp. Module	Module temperature sensor measurement	
Wind Speed	Wind speed sensor measurement	m/s
Wind Direction	Wind direction sensor measurement	degrees
Irradiance Global	Global horizontal irradiance	W/m2
Irradiance Direct	Direct irradiance	
Irradiance Diff.	Diffused irradiance	
Irradiance POA	Plane of Array (POA) irradiance	

NOTE:

The temperature units are configured in °C by default and can be changed to °F under the **Temperature** submenu located under the **Display** menu.

- **Two Points**: **P0** and **P1** represent points on the sensor graph to be configured in the gateway. The values refer to the measurement signal and the measurement range from the sensor datasheet. Refer to the example below.
- **Set point**: Enables entering two signal values (voltage, current or temperature)

Example of Sensor Graph Configuration

The following is an example of setting a temperature sensor with the following specifications:

- Measurement signal: 0..10V
- Measurement range: -10...+70°C

The following graph shows the min. and max. values, and the focused (linear) area.

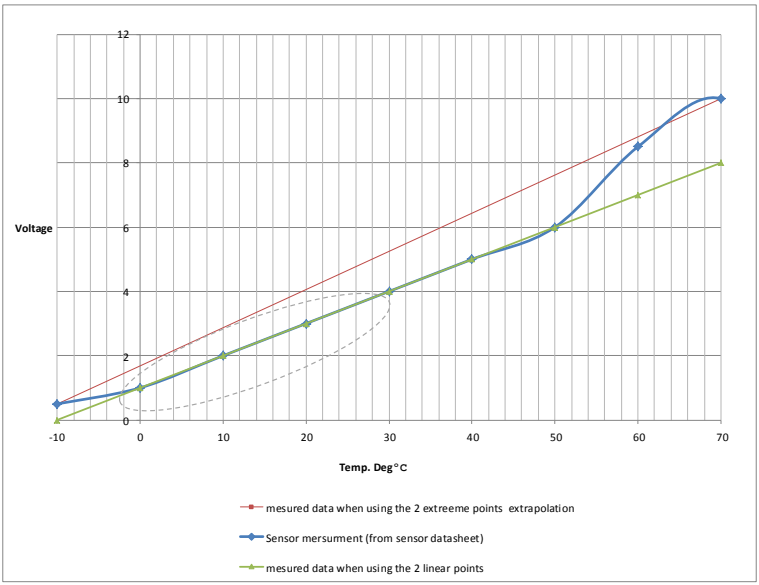


Figure 15: Example of Sensor Graph

If you want to include the whole range of the sensor, use the information from the sensor datasheet, that is, the points for settings are the minimum and maximum values:

```
P 0   < 0 , - 1 0 >
P 1   < 1 0 , 7 0 >
```

However, if you want to focus on an area of the graph, set any value for the two points, as long as the points are within the SolarEdge gateway selected range. The SolarEdge gateway then extrapolates the sensor linear graph based on these two points.

```
P 0   < 1 , 0 >
P 1   < 5 , 5 0 >
```

Connecting Sensors to the SolarEdge Gateway

Sensors are directly connected to the SolarEdge gateway via the sensor interface connector. Use the supplied 7-pin terminal block. Figure 16 shows the location of the sensors connector on the gateway.

Sensor Connector Pin #	Pin Name	Description
1	V1	Voltage sensor input number 1
2	GND	Ground (common for both V1 and V2)
3	V2	Voltage sensor input number 2
4	I-	Current sensor input – negative
5	I+	Current sensor input – positive
6	GND	Ground
7	12V	12VDC output voltage supply to the sensors. (limited to 800mA)

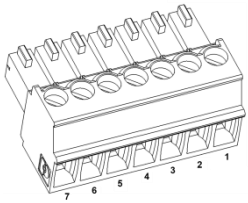


Figure 16: Sensor Interface Inputs

To connect a voltage sensor:

1. Connect a voltage source sensor to either V1 or V2, depending on its operating range. Voltage sensors support the following software selectable ranges:
   - V1: 0 – 10 Vdc or 0 – 2 Vdc.
   - V2: 0 – 2 Vdc or 0 – 20 mVdc.

2 Use a 4-wire twisted pair cable for this connection. Recommended wire size is 20 AWG/0.52mm^2 with maximum length of 500m/1640.4ft.

3 Depending on the sensor range, connect the sensor between V1 (pin1) and GND (pin 2), or between V2 (pin 3) to GND (pin 2).
The GND (pin 2) serves as a common ground for both V1 and V2.
The 12V (pin7) can be used as the supply voltage to the sensor. Optionally, an external power supply can be connected to the sensors if a different input voltage to the sensor is required.

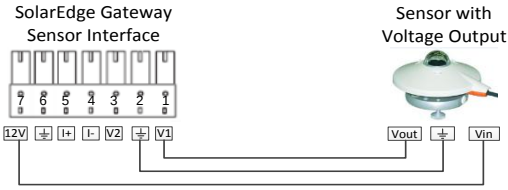


Figure 17: Voltage Sensor Connection

CAUTION!

Excessive voltage on the sensor input can damage the SolarEdge gateway. Refer to input ranges specified in *Appendix A: Technical Specifications* on page 41.

To connect a current sensor:

Use a 4-wire twisted pair cable for this connection. Recommended wire size is 20 AWG/0.52mm^2 with maximum length of 500m/1640.4ft.

Connect a current source sensor to either I+ or I-, depending on its operating range:

- For positive current:
  - I+ (pin 5) connect to the current output (Iout) of the sensor
  - I- (pin 4) – connect to ground.
  - GND (pin 6) connect to the ground connection terminal of the sensor
  - The 12V (pin7) can be used as the supply voltage to the sensor. Optionally, an external power supply can be connected to the sensors if a different input voltage to the sensor is required.

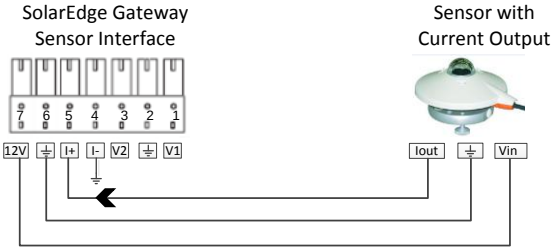


Figure 18: Current Sensor positive Connection

- For negative current:
  - I - (pin 4) connect to the current output (Iout) of the sensor
  - I+ (pin 5) – connects to ground.
  - GND (pin 6) connect to the ground connection terminal of the sensor
  - The 12V (pin7) can be used as the supply voltage to the sensor. Optionally, an external power supply can be connected to the sensors if a different input voltage to the sensor is required.

CAUTION!

Excessive current on the sensor input can damage the SolarEdge gateway. Refer to input ranges specified in *Appendix A: Technical Specifications* on page 41.

Configuring the Sensors in the SolarEdge Gateway

To enable the sensors in the SolarEdge Gateway:

1. Enter Setup mode, as described in *Setup Menu Options* on page 14.
2. Under the main menu, select **Sensors**.
3. Select the preferred sensor submenu (**V1**, **V2** or **I**), and select **Enable**.

```
Sensor   <EN>
Range<0-2V>
Type   <Irr>
Two  Points
```

To configure sensors in the SolarEdge gateway:

Configure the working range of the sensor that covers the sensor specification. Refer to the example on page 36.

1. Select **Range** under the specific configured sensor and then select the applicable range:
   - V1 – select a range between 0 – 10 Vdc or 0 – 2 Vdc.
   - V2 – select a range between 0 – 2 Vdc or 0 – 20 mVdc.
   - I –0 – 20 mA.

```
0 - 2 V
0 - 2 0 mV
```

2. Select the **Type** of the connected sensor from the following:

```
Temp.  Ambient
Temp.  Module
Wind  Speed
Wind  Direction
Irradiance  Global
Irradiance  Direct
Irradiance  Diff.
Irradiance  POA
```

3. Select **Two Points** to configure two points on the sensor graph using the measurement signal and measurement range data from the sensor datasheet.

```
P0   <0.0,0.0>
P1   <1.000,1.000>
```

4. Set the point values as follows:
   - Use the **Up** and **Down** buttons to adjust the value.
   - Press the **Enter** button to move to character.
   - Long press the **Enter** button (until **Applied** message appears) – apply the value
   - Long press the **Esc** button (until **Aborted** message appears) – erase all characters

```
Set  Point
(V,DegC)
10,70
```

5 If required, repeat steps 1 through 4 above to configure additional sensors.

6 Check the Sensors status screen on the LCD, and verify that the sensor's readings are within the range that appears in its datasheet. Refer to *Sensors Status* on page 22.

```
Sensors
V1: XXX.XXX  DegC
V2: XXX.XXX  W/m2
I  : Disabled
```

Appendix A: Technical Specifications

Power	Description		Units
Power Supply – wall mount	Included, 100–240 VAC, EU/UK/US/AU interchangeable 2-pin plug		
Supply Voltage	9-14		Vdc
Connector Type	terminal block		
Power Consumption	<2		W (typ.)
Analog Sensor Input			
Number of Inputs	3		
	Range	**Accuracy**	**Resolution**
Input 1	0–2V or 0–10V	+/-1% f.s	10-bit
Input 2	0–20 mV or 0–2V		
Input 3	-20 mA – 20 mA		
Communication Interfaces	**Type**	**Max. Length**	
Ethernet Interface	10/100-BaseT	100/328	m/ft.
Wireless Connections	ZigBee module(*), GSM(*) (**)		
Power Reduction Interface	4 control pins, 5V, GND	50/165	m/ft.
RS232 Interface	For local connection		
RS485 Interface	Two separate ports	1000/3330	m/ft.
Supported Devices Over RS485			
SolarEdge Devices	Yes		
Revenue Meters	Yes		
Export Inverter Data	Yes		
Export Data to Non-SolarEdge Logger	Yes		
Environmental			
Operating Temperatures	-20 to 60 / -4 to 140		°C / °F
Protection Rating	IP20 Indoor		
Mechanical			
Mounting Type	DIN rail/ Wall mount		
Dimensions (L x W x H)	161.6 x 90 x 62 / 6.36 x 3.54 x 2.44		mm / inches
Weight	< 0.5 / 1.1		kg / lbs
Standard Compliance			
Safety	UL60950-1, IEC-60950-1		
EMC	FCC Part 15 class B, IEC61000-6-2, IEC61000-6-3		

* Sold separately. See individual product specifications for supported locations.

** EU only

Mechanical specifications:

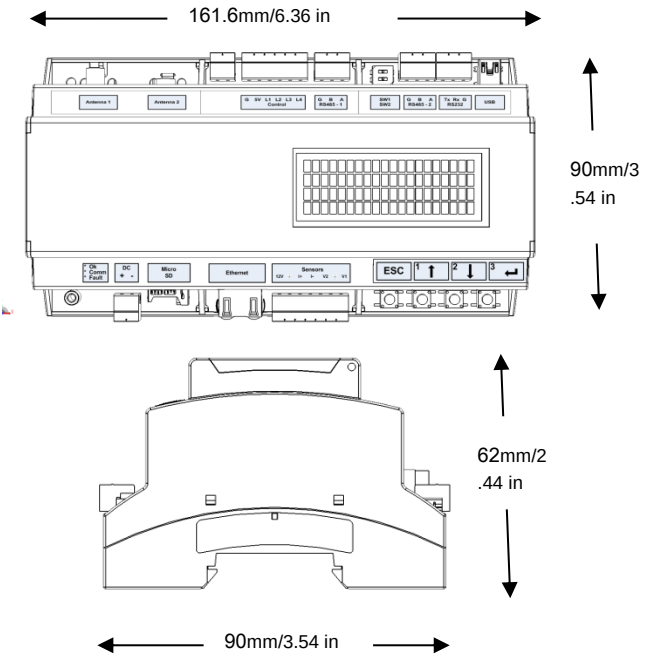


Figure 19: SolarEdge Gateway Mechanical Specifications

If you have technical queries concerning our products, please contact our support through SolarEdge service portal:
http://www.solaredge.com/groups/support/services

North America	(Toll free) 1877 360 529 2
Australia	(Toll free) 1800 149 229
Germany	089 454 597 30
France	(Toll free) 0800 917 410
Italy	(Toll free) 0800 784 824
United Kingdom	(Toll free) 0800 206 105 8
Belgium	(Toll free) 0800 730 41
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